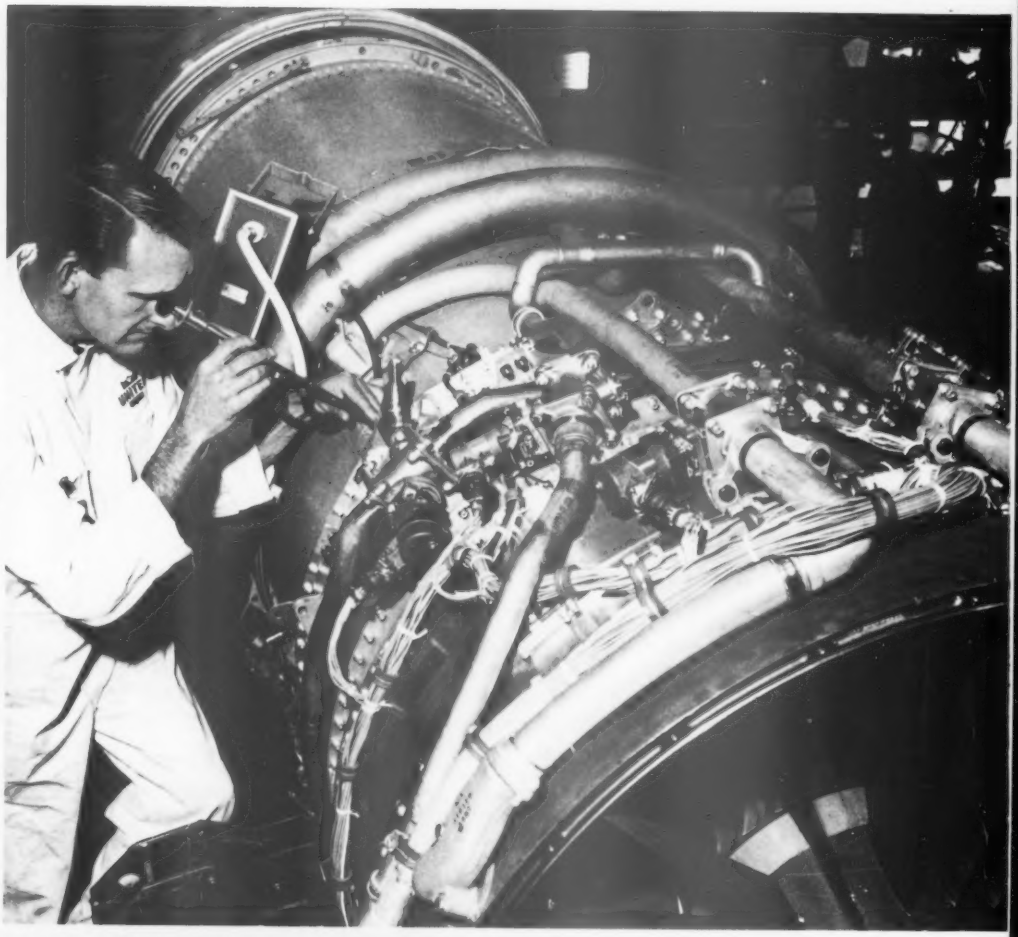
FAA AVIATION NEWS

STACKS

APRIL 1968



COVER

Competition for Mechanics Awards turns up bright new safety ideas. See page 10.

FAA AVIATION NEWS

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION VOL. 6 NO. 12

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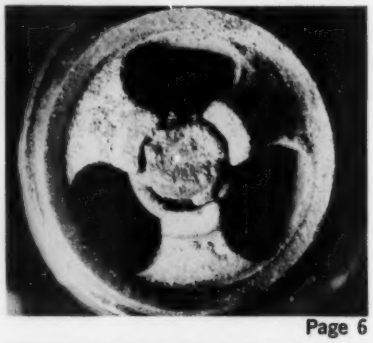

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FAA reorganizes airframe and powerplant written examinations

Mechanics seeking FAA airframe and powerplant certificates after July 1, 1968, will show their knowledge and skill in a revised three-section examination. There is no substantial change in the subject matter, but the test material has been reorganized.

A new "general" section will be the same for both airframe and powerplant ratings. Once this section has been passed, the applicant need not usually take it again when trying for the specific rating.

The remaining two sections in the airframe test are "Airframe Structures" and "Airframe Systems and Components." The powerplant sections are "Powerplant Theory and Maintenance" and "Powerplant Systems and Components."

A completely revised certification guide, designed to assist A&P candidates, breaks down all areas of testing and provides a clear preview of what kind of question will be asked about each subject.

The guide establishes, for the first time, levels of knowledge and skill expected of the applicant in each of the subjects. Each broad subject area has been assigned a number from 1 to 3, which indicates the degree of knowledge and skill required. The levels are fully explained in the text of the guide. The level tag will help the student to budget his study time appropriately.

The guide has been rewritten to reflect current aircraft maintenance trends and techniques. De-emphasized are questions on aircraft woodworking and fabric working, since in modern practice most of this kind of work is being done by specialists.

In order to qualify for a mechanic's certificate, a candidate must also pass an oral and practical test for at least one rating. While the written test *must* be administered by FAA Flight Standards inspectors, the oral and practical phases can be done either by Flight Standards inspectors or by FAA-designated examiners.

FAA-administered oral and practical tests are conducted without cost, although the applicant has to furnish the necessary facilities, materials and equipment. Since designated examiners are not paid by FAA, they are authorized to charge for their services and the use of their facilities and equipment.

To be eligible for an A&P certificate, a candidate must be at least 18 years old, and able to read, write and speak English (applicants who do not meet the language requirement but who work outside the U.S. for a U.S. air carrier will have their certificates endorsed "valid only outside the U.S.").

He must also be a graduate of a certificated A&P school (or have 18 months practical experience for a single rating or 30 months practical experience for both ratings), and pass all the prescribed tests within 24 months.

Written tests can be taken at FAA Flight Standards district offices and at most Flight Service Stations. Given sufficient advance notice, tests can sometimes be arranged at other locations. Many FSS administer exams after normal work hours and on weekends.

To eliminate the possibility of mutually wasted time, a candidate should make arrangements for his exam as far before the date of testing to assure that the appropriate persons will be on hand to give the tests and that testing facilities will be available. An applicant must show that he meets the experience requirements before the written test is begun. If he is not a mechanic school graduate he may show by letter from his employer, work records, military records, or other documents that he has the required experience.

On the day of the exam, the applicant should expect to spend up to five hours each on the powerplant and airframe written tests. Questions are multiple choice, and none are framed to trick or mislead the applicant.

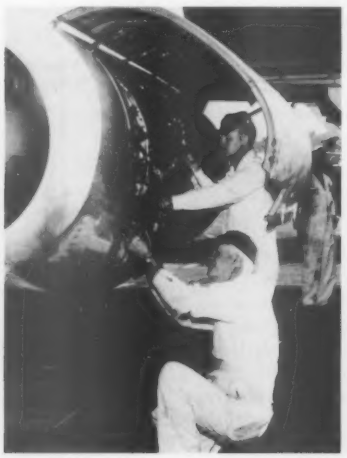
All written test answer-sheets are forwarded to FAA's Aeronautical Center, Oklahoma City, Okla., for grading. The applicant can expect to receive a report of his performance within 10 days. The minimum passing grade is 70 per cent.

The oral and practical test results are available immediately from the tester.

Persons failing any part of the test—written, oral or practical—for a certificate or rating, or for an additional rating, may reapply 30 days after the date he failed the test. He may also get 5 hours of additional instruction in each of the subjects failed if he wants to retake in less than 30 days.

Complete information on eligibility criteria, the procedure for application and the test content is contained in "Airframe and Powerplant Mechanics Certification Guide" (AC 65-2A), available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 for 40 cents a copy. ■

Demand for skilled aviation maintenance technicians mounts. Tech schools had 8,000 students in 1966; 11,447 in 1967.



RADAR BRITE

"...Hold over the water tower.

...Report over the stockyards.

...Turn 90 degrees left at the Pagoda."

Phrases like these, used in air traffic approach control, have been mystifying and irritating pilots new to terminal areas for years. Now, thanks to a bright new radar invention, they are on their way out.

A television receiver 20 times as bright as the ordinary living room TV set is the latest tool developed by FAA to increase air safety around airports, and help tower controllers speed arriving and departing air traffic. A new picture tube, which represents a major technological breakthrough, is the key component in a five-part assembly that makes it practical to use TV-type radar scopes in the varying light conditions found in glass-walled control tower cabs. The equipment will operate with airport surveillance radar, and has a maximum range of 60 miles.

The entire assembly, called BRITE I (Bright Radar Indicator—Equipment) consists of the TV display unit and its remote control panel, mounted in the cab, and a plan position indicator (PPI), light shield and TV camera located in the tower equipment room.

The plan position indicator, an integral part of all radar systems, receives signals from the radar antenna and displays them on a scope as light blips at a correct bearing and distance from the point represented by the antenna. This system produces a low-level light display, which normally must be viewed under conditions of subdued light, as in the darkened IFR room of a control tower.

Miniaturized Equipment

The PPI used in BRITE I is a marvel of miniaturization. "Normal" PPIs weigh approximately 400 pounds and require two racks of electronic equipment, each weighing about 200 pounds and taking up considerable storage space. The BRITE I PPI is a compact cube measuring 27¼ inches long, 16¼ inches wide and 11½ inches high. It weighs a modest 80 pounds, plus 16 pounds for the camera.

The TV camera and the PPI are mounted as a single unit, with sufficient space between them to allow for the camera's focal length. The interval between the camera lens and the face of the PPI is completely enclosed by a light shield to insure maximum clarity of the picture. Camera, light shield and PPI measure 60 inches overall and the unit is suitable for mounting horizontally on its own mounting bracket or it can be secured to a relay rack in the equipment room.

The TV camera is an "off-the-shelf" model, and like the PPI it is solid state, except for the vidicon. (Vidicon, for "video-conversion," is a vacuum tube that converts the optical or visual image picked up by any TV camera into an electrical signal which is then transmitted to a TV receiver as electrical energy.) The camera used in BRITE has a Wollensak 2 inch (50 mm) f 1.5 Raptar lens with a standard 16 mm "C" mount.

Cab "Movies"

The "picture" is sent to the tower display unit—the TV receiver—via cable. The TV camera will faithfully transmit what it sees to the TV receiver in the tower cab. What the camera sees is determined by a control panel in the cab which gives the controller a wide variety of options. Among other things he can select the PPI range through five positions—6-10-20-30-60 nautical miles This is very much like changing channels in a home TV receiver. He can adjust the moving target indicator (MTI) which eliminates ground clutter or he can select a normal radar return.

De-centering controls enable the controller to "change" the position of the antenna as seen on the scope. This *apparent* change in antenna location provides more flexibility and permits the controller to scan a specific area in more detail. An erase button allows the controller to wipe out data stored in the vidicon. For maximum efficiency in the varying light conditions in the control cab, the controller can adjust contrast and brightness with independent dials.

The tool of direct concern to the air traffic controller, the display unit in the tower cab, is a self-contained 945-line, solid state television monitor with a 12 inch round cathode ray tube. This tube is the heart of the display unit, which operates on 25,000 volts, compared to the 15,000 to 18,000 used in the average home TV receiver.

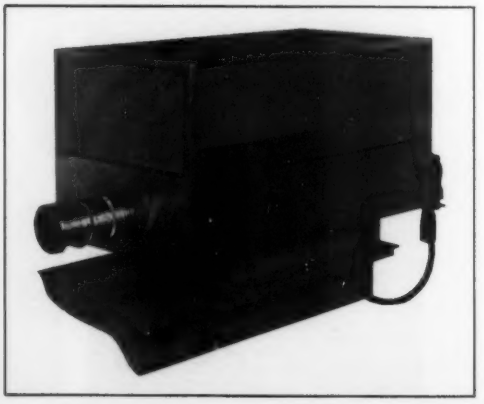
Surface reflection, a source of annoyance and distraction, is minimized by an etched neutral density filter bonded directly to the faceplate of the tube. The etching, consisting of fine lines, prevents "spectral" or mirror reflection of the controller's face, glasses, white shirt, tie clip, etc., which is aggravated by the fact that he is generally in motion when observing the scope. A movable, detachable sunshield provides shelter from direct sunlight on the tube face.

The tower display unit is equipped with brightness and contrast controls so that these functions can be operated independently of the brightness and contrast rheostats on the main control panel. One or more slave display units may be added to the main unit by simple electrical connection.

The desirability of having a radar display of some kind in the control cab is not particularly new. Various approaches have been used, including installation of the PPI unit itself in the cab. Before BRITE, cab installations required hooded shields to provide the contrast needed in the varying prevailing light conditions. The hoods not only did not provide adequate contrast, but they were self-defeating because the controller had to look through a restricted device which in some cases was little more than a port hole.

An additional drawback, which had accident potential, was the appreciable time

TV camera is an off-the-shelf model.



Above—New bright radar display in tower shows up clearly despite glare of waist to ceiling glass walls. Left—Controller has no difficulty seeing the clearly defined dots on the face of the display.

lag in focusing on a distant scene after close, intense scrutiny of the display in the cab. Similarly, the time lag applies in focusing from distant to near objects. In either case, the controller's vision was handicapped.

Speed and Distance

In the meantime, aircraft speeds, traffic mix and density have increased at a continuing and rapid pace, demanding more accurate control at greater distances from the airport than is possible with the human eye, even when aided by field glasses.

In mid-1966 FAA's System Research and Development Service tackled the problem in dead earnest. Think sessions resulted in drawings, and the drawings were transformed into "breadboard"—working models at FAA's National Aviation Facilities Experimental Center (NAFEC), Atlantic City, N. J. A year of field trials at Atlanta Airport followed. Results were so encouraging, a contract was awarded to International Telephone and Telegraph Corp., Fort Wayne, Ind., to build a prototype.

The prototype was installed in the Baer Field control tower at Fort Wayne, Ind., where it not only exceeded performance expectations but was an instant hit with the controllers.

"This is the best we have ever seen in bright display and something that FAA has needed for a long time," Neal Rupert, acting chief of the Baer tower said. "The equipment will be especially helpful with the higher speeds of jet traffic. This will be a great aid in handling traffic in low visibility in instrument landings and in preventing near misses."

88 New Units

So it will. Last March FAA placed a $1.5 million order for 88 of the units which will be installed in towers. One is scheduled for Honolulu; Alaska will be equipped later. Installation began this month, with completion scheduled by the end of the year. Average price of a BRITE system is $15,315, plus an additional $4,800 (estimated) for installation costs.

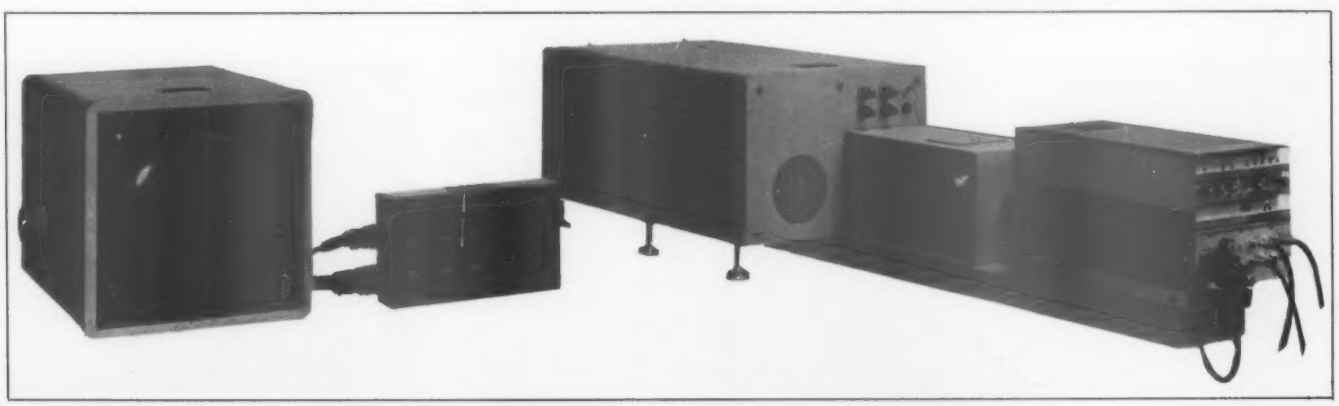
Both pilots and controllers will share in BRITE benefits. Tower controllers will be able to monitor flights more closely, spot potential traffic conflictions before they become serious and expedite traffic flow.

Pilots will be able to make their final approach to the runway with greater assurance that other arriving and departing flights will be properly spaced by controllers watching them on BRITE. Headed for extinction are not-so-accurate position reports such as "over the stadium". With BRITE, controllers will be able to pinpoint the aircraft's position accurately.

Airport utilization is expected to improve as well, since controllers will not have to issue overcautious instructions when directing traffic movements which they cannot see, due to restricted visibility or low clouds.

BRITE might very well turn out to be the brightest terminal air traffic control ideas of them all. ■

BRITE is model of compact design which can be adapted to all FAA towers.

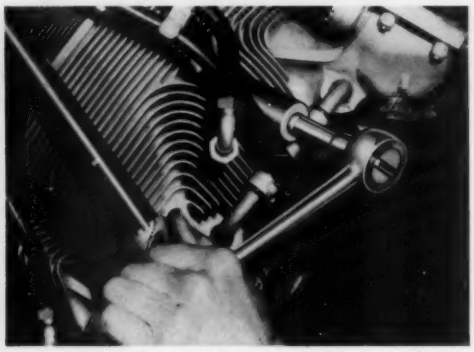


What's Up Front

4

Hardworking and dependable, the spark plugs in your engine demand very little in the way of maintenance, but proper understanding of their nature can prolong their life and your safety.

SPARK OF LIFE



Use deep socket wrench to remove plugs, using steady counterclockwise pressure.

Like the human heart, which depends on a minute nerve impulse for life, the aircraft engine requires an electrical spark for each piston thrust. As well made as the engine itself, aircraft spark plugs function in extremes of temperature, pressure, and voltage not ordinarily demanded of any other single electrical mechanical component.

Within an instant after starting, an aviation spark plug is bathed in temperatures as high as 3,000° F, gas pressures with a force of 2,000 pounds per square inch, and voltages as high as 15,000 volts. It must operate in this environment for hours at a time, through changing altitudes and power settings. By the time a plug has logged 100 hours it will have fired some 7 million times.

The figure becomes impressive when the life of an aircraft spark plug is considered—in light aircraft this can range from 200 to 800 hours, depending on the design of the engine, its operation and maintenance. Airlines have operated plugs over 1,000 hours without pulling them, although this is exceptional longevity. There is no reason to extend a device that costs, on the average, about four dollars.

The spark plug is the final terminus of the aircraft ignition system, where the charge generated by the magneto is delivered inside the cylinder to ignite the fuel/air mixture. The electrical current is brought to the plugs from the magneto distributor by way of the ignition harness. From start to finish—from magneto switch to spark plug—the modern ignition system is *shielded* to prevent interference with the aircraft radio system. The shielding is necessary because the magneto, being a special form of high-frequency generator, behaves like a radio transmitting station. An unshielded system causes the aircraft radio to pick up "static".

Waterproofing the system is also important. As the engine is directly aircooled, the ignition must operate, at times, in a very wet environment. Complete waterproofing is sometime harder to accomplish than adequate shielding.

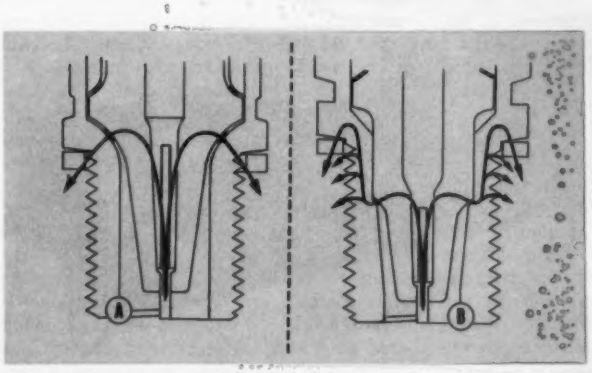
Shielding usually is not difficult. The magneto case is made of nonmagnetic metal, the ignition harness is covered with a fine wire mesh sheathing, and most aviation plugs are built with a radio-shielding barrel. Incidentally, all aircraft plugs come two to the cylinder—both for safety and for more efficient ignition.

The spark is induced when the high voltage current leaps across the gap from the central electrode to the ground electrodes seated in the spark plug shell. Theoretically, a simple enough task, but in actual practice the wide variety of designs available in modern aircraft engines imposes a need for special spark plug designs to assure best performance.

The spark plug looks disarmingly simple. Indeed, its three main components—the electrode, ceramic insulator, and outer shell—have remained virtually unchanged in appearance for almost 50 years. The outer shell, threaded to fit into the cylinder, is made of finely machined steel, and is often plated to prevent corrosion from engine gases, and possible thread seizure. Close tolerance screw threads and a copper gasket prevent cylinder gas pressure from escaping around the plug. Pressure that might seek to escape *through* the plug is halted by inner seals between the outer metal shell and the insulator, and between the insulator and the center electrode assembly.

The ceramic insulator provides a core around the electrode. In addition to affording electrical insulation, the core also has the function of transferring heat from the ceramic tip or nose, to the cylinder body.

The spark plugs are called hot or cold,

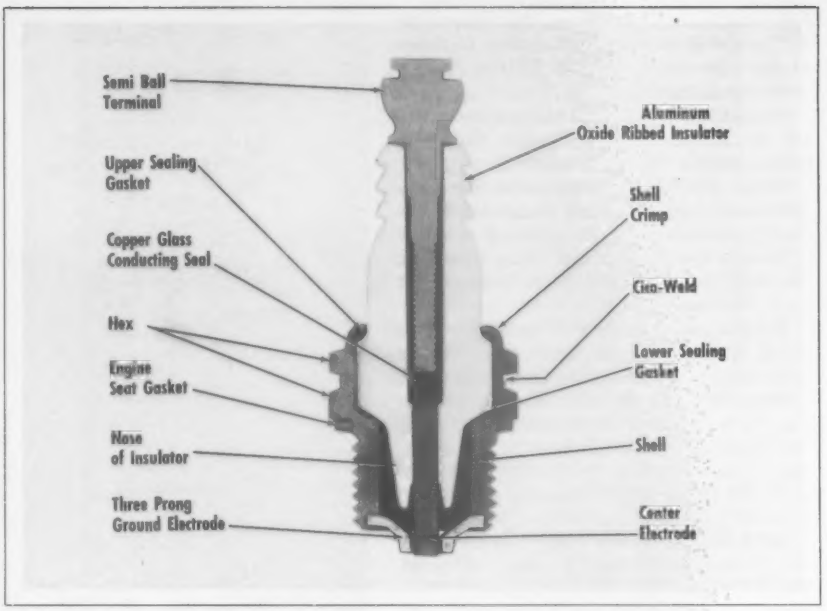


Left—"A" is called a hot plug because of long heat travel path. Cold plug "B" is so-called because short path dissipates heat rapidly. Right—First step in plug removal is to loosen terminal nut. Use extreme caution as terminal elbow is easily twisted and crimped. Do not over-torque on reassembly.

according to the plug's ability to transfer heat from the firing end to cylinder head. Unless this heat transfer is exactly engineered, the plug may either cause pre-ignition if the core nose temperature exceeds 1,630° F, or fouling or shorting due to carbon deposits if the temperature drops to 800° F or lower.

If an engine were operated at one speed only, this would greatly simplify design, but flight demands impose different loads on the engine. Plugs must be designed to operate as hot as possible at slow speeds and light loads, and as cool as possible at cruise and take off power. The most efficient design aims at producing a spark plug for a specific engine type that will have a core nose temperature range between 1,000° F and 1,250° F.

The rule of "opposites" is an easy way to remember the difference between *hot* and *cold* plugs. A *hot* plug, one that holds heat and transfers it *slowly*, is fitted to a cold engine (low horsepower). Hot plug—cold engine. Similarly, a *cold* plug, which loses or transfers heat rapidly, goes with a hot engine.



The choice, hot or cold plugs, is beyond the option of the aircraft operator. The type is determined by the engine manufacturer after extensive tests, and with the approval of FAA. In some cases, an engine may be certificated for two heat ratings. Choice then is determined by how the engine is to be operated.

The spark plug gap—the space between the center electrode and the ground electrodes—is directly related to spark plug life. As the plug is used, the gap tends to increase due to erosion from the constant blasting of high voltage as it leaps the gap to make the spark. The high temperatures inside the cylinder, and the corrosive effect of combustion gases, contribute to the erosion.

When the gap exceeds the manufacturer's recommendation, increased electrical energy is required to create a spark. The higher voltage is generated automatically by the magneto, but at a price; the higher voltage has a tendency to leak through the ignition wire insulation or terminal connectors providing the possibility of failure in the high tension leads. A used plug may require as much as 50 per cent more voltage than a new plug.

Excessive erosion calls for investigation of the engine timing, operating conditions, and proper heat range of the plugs.

Improper grade fuel can also have a detrimental effect on spark plug life. When the fuel grade recommended by the operator's manual is not available, the next *higher* grade should be used; never resort to a lower grade. The lower grade fuel creates excessive combustion chamber temperatures and accompanying severe burning of the electrodes. The *higher* grade fuel can lead to lead fouling, but only when used over a protracted period.

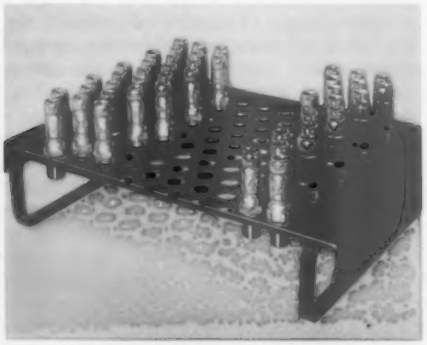
Aircraft used in crop dusting, and those operating from dirt strips, are especially susceptible to spark plug fouling from dust. Even when the air is not noticeably "dirty," sufficient quantities of contaminants can exist to cause plug fouling unless the air filters are well maintained and in good repair. The dust combines chemically with the lead deposits normally found on the plugs, to form lead silicate, which results in severe misfiring.

Cold weather operation makes heavy demands on the entire aircraft, but especially on ignition. When everything else checks out, mysterious non-starts may be traced to ice bridging the electrodes. Cold, moisture-laden air, entering the warm engine at engine shut-down, or when the engine fails to sustain a start in cold weather, quickly condenses and freezes. A blob of ice on the electrodes ends all chance of ignition until the plugs have been thawed out.

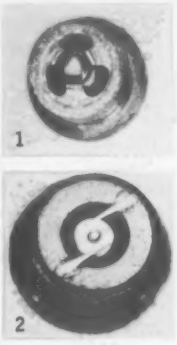
Misfiring can also result from jockeying the throttle rapidly from idling to high power settings. This raises engine temperatures suddenly, which in turn enhances the electrical conductivity of deposits already formed on the electrodes. ■

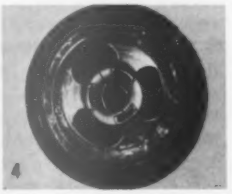
—Frank J. Clifford

(A follow-up article will treat spark plug maintenance and failure prevention in greater detail and discuss jet ignition.)



Left—Place plugs in numbered holder to aid in locating engine troubles. Holder also prevents damage to plug threads, insulator and electrodes. A drilled board makes a substitute plug holder.





Typical plug troubles: 1 and 2 are worn out electrodes; 3 is an example of a cracked insulator; 4 shows cracked tip.

Terminal Delays

By 1970, peak period traffic delays could exceed two hours at major U.S. airports.

A study of the causes and possible means of reducing terminal delays at major airports has been released by the Federal Aviation Administration.

Undertaken in response to questions raised by the Bureau of the Budget, the study sought answers to these questions:

What are the principal alternative approaches—regulatory and technical—to reducing aircraft delays in terminal areas?

Over a five-year period, what would be the total costs (Federal, local, private) for each alternative?

What improvement (in passenger time saved, airline operating costs, etc.) would be achieved by each alternative approach?

Major airports for New York City, Chicago, Los Angeles, Washington, D.C. and San Francisco form the basis of the study. Departure or arrival delays that could exceed two hours, by 1970 during peak traffic periods, were predicted at five of the eight airports studied unless some corrective action is taken. Increasing delays at other major airports are also anticipated.

Specific recommendations in the report include automation of final approach and sequencing functions, consideration of reduced radar separation, new airport construction with an emphasis on parallel runways and dual independent ILS capability, flattening the peak periods of air traffic activity by local regulations, and encouragement to industry to build aircraft with slower landing speeds.

AUTOMATION. Computer aided approach spacing (CAAS) is an extension of air traffic control automation planned by FAA for the nation's busiest air terminals. Instead of relying only on his own visual interpretation of radar targets, the controller has available computer derived information for advising pilots to speed up, slow down, or make a turn behind another aircraft in order to achieve the most efficient spacing between aircraft approaching an airport.

The benefit/cost ratio of this program is considered extremely favorable—more so than any other available alternative.

REDUCED RADAR SPACING FOR IFR. At present aircraft making an IFR approach to a runway are spaced by the radar controller mantaining at least a three-mile longtudinal separation. While capacity is increased and delays are reduced by conducting simultaneous ILS approaches to runways spaced at least 5,000 feet apart, this same three-mile radar spacing is required between aircraft on the same ILS.

Departing IFR traffic must be separated logitudinally by at least two miles from an arriving aircraft before being released for takeoff. This rule applies whether the arrival and departure are on the same or parallel runways (unless certain runway separations exist).

The study concludes that significant gains in IFR capacity could be achieved through reduced radar spacing and recommends an analysis of air traffic control radar separation requirements with a view to determine whether such reductions could be made without affecting safety.

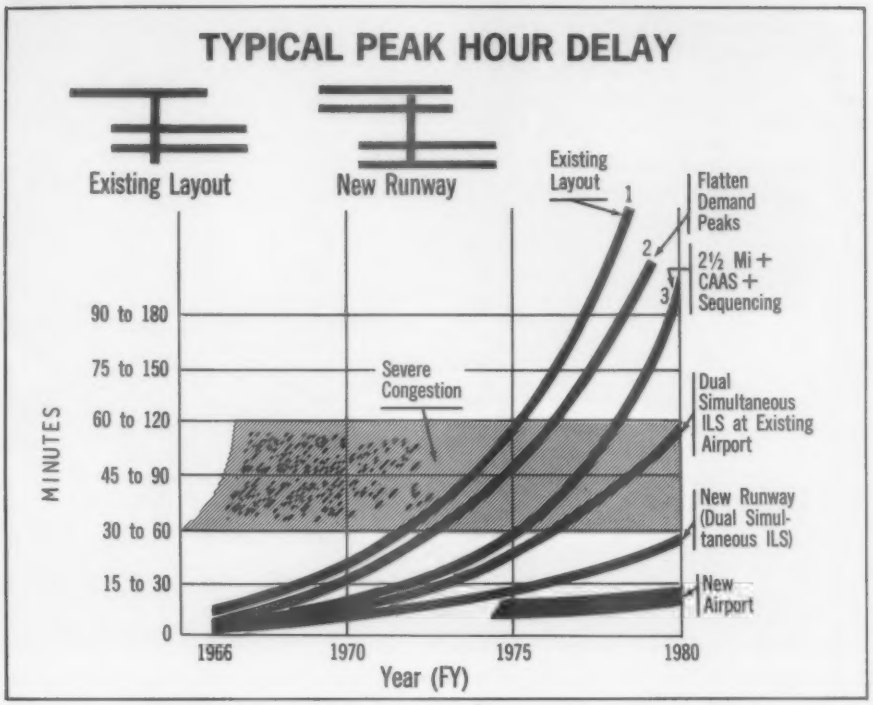
Such a study is currently underway.

NEW AIRPORT CONSTRUCTION. The anticipated rise in air traffic is such that in major cities the cost of building new airports or significantly improving existing ones by adding new runways, runway extensions, improved taxiway exits, etc. will be quickly balanced by the benefits derived from more efficient air traffic flow.

Only a few of the existing major airports have parallel or multiple parallel runways. The addition of widely separated runways for simultaneous air carrier use would greatly enhance the present traffic capacity. The study also concludes that large benefit/cost ratios can be achieved by providing additional parallel runways for general aviation use.

FLATTENING DEMAND PEAKS. The study determined that congestion can be relieved substantially at busy airports if demand can be more uniformly distributed during the day. The study suggests the following concepts be evaluated for accomplishing this:

1. A limitation can be placed to keep airport activity within its normal capacity.
2. Advance scheduling can be required for busy airports. Other aircraft can be handled on a standby basis.
3. Landing fees may be raised during peak hours and lowered during off peak hours.
4. Passenger fares may be reduced during off peak hours, or raised during peak hours. (Such fare differentials are already in existence with the approval of the Civil Aeronautics Board).
5. Differential fares can be established for a city which has more than one airport, and where traffic is heavily concentrated at one of these airports. (Busy Washington National Airport and the under-used, although ultra modern Dulles International Airport near Washington, D.C. were cited as examples).
6. Airports may be limited to aircraft of



An FAA Staff Study

by Milton Meisner, Edward Van Duyne and Walter Faison

a specific weight or passenger-capacity range during peak hours, with other aircraft handled on a standby basis.

SLOWER LANDING AIRCRAFT. These would cut down on runway length requirements and runway occupancy times. The full exploitation of the flexibility of V/STOL aircraft, especially for feeder line and short haul traffic, could greatly improve airport utilization if these aircraft can be controlled independently under IFR conditions.

Figure 1 is a typical presentation of delay buildup at one of the airports for the various alternatives examined. The horizontal scale shows the year during which the level of delay given on the vertical scale would be reached. For example, existing facilities would result in a typical peak hour delay of 30 to 60 minutes by about 1972. Delays above this level are considered to result in severe congestion (black area).

The extended line shows that delays could reach 60 to 120 minutes by 1975, if no improvements are added; however, it is doubted whether users will tolerate severe delays of the magnitude projected. Short haul travelers would consider using other competitive transportation.

The alternative of more uniformly distributing operations by limiting peak hour demand to 6% of the total daily demand would result in postponing the occurrence of severe congestion by one year (second curved line). Automation of the final approach spacing function (CAAS), in combination with procedural alternatives of reduced radar spacing and speed class sequencing, would result in postponing severe congestion to 1975 (third line).

PREDICTED DELAYS FOR PEAK HOURS—FIGURE 2

Airport	Year Delay May Reach— ¼ to ½ hour	½ to 1 hr.	1 to 2 hr.
Kennedy	1966	1968	1970
LaGuardia	1970	1973	1976
Newark	1969	1972	1974
National [2]	—	—	—
O'Hare	1966	1969	1972
Los Angeles	1970	1972	1975
San Francisco	1979	1984	—
Oakland	1985	—	—

[2] Scheduled operations limited to 40 per hour.

Delay will continue to build up, no matter which alternative is undertaken, since demand will continue to rise. However, the benefit of each alternative for any year is obtained from Figure 1 by taking the difference between the delay for existing conditions and the delay for any alternative. For example, in 1975, the benefit of having dual simultaneous instrument approach capability for the existing three parallel runway layout is a reduction of peak hour delay from the 60 to 120 minute range to about 25 to 50 minutes; this results in a 35 to 70 minute benefit in reduced delay.

The buildup in delays at other airports in the study is given in Figure 2. It shows that delays are rising very rapidly at most of the airports studied and may exceed intolerable levels at five of the eight airports between 1970 and 1975, if no improvements are made.

Besides the rapid increase in delays at high-activity airports, the study shows the unit cost of delay is also increasing sharply, as larger and faster jets make their appearance. Figure 3 shows the potential cost per minute of delay at the various airports in the study.

COST OF AIRCRAFT DELAY—FIGURE 3

Airport	Cost per minute of Delay 1966	1970	1975	1980	1985
Kennedy	$9.39	$11.80	$14.20	$16.91	$19.62
LaGuardia	3.70	4.90	6.10	6.61	7.12
Newark	6.45	7.44	8.42	9.91	11.39
National	3.66	4.61	5.47	6.30	7.22
O'Hare	7.07	8.23	9.39	10.75	12.10
Los Angeles	8.46	10.09	13.39	17.71	20.48
San Francisco	7.54	8.71	9.87	11.46	13.04
Oakland	1.78	2.87	3.95	4.86	5.76

The potential reduction in annual delay times the cost of delay (Figure 3) is compared to the cost of each alternative, which is established separately for each airport.

Whereas the greatest reduction in delay is obtained by new runways and new airports, the *highest return per dollar spent* would result from automation (CAAS) and procedural changes, assuming that these prove feasible.

Although the study did not evaluate benefits and costs of the terminal building area and ramp congestion problem, it indicated that potential solutions to this problem in the future may consist of satellite off-airport terminals, served by convenient rapid transit, for the ticketing,, parking, and baggage handling functions of originating and terminating passengers.

Copies of the FAA study, "Alternative Approaches for Reducing Delays in Terminal Areas," are available for $3.00 each from the Clearing House for Federal Scientific and Technical Information, Springfield, Va. 22151. Specify the report number: *"AD 663 089" when ordering. Checks or money orders should be made payable to the Clearing House for Federal Scientific and Technical Information.* ■

Mechanic's HALL of FAME

National Airlines mechanic Robert H. Cook of Miami, Florida, views the modification he made on a Boeing 727 fuel access door. This door sometimes opened in flight damaging leading edge.

Left to right—Calvin Loo and Philip Akai, Aloha Airlines, Honolulu, invented labor saving lift. General all-around excellence as a mechanic earned a plaque for Clarion P. Young, Air Service, Honolulu. Robert M. Garmon, Des Moines Flying Service, was a general aviation winner.

Demonstrating that effectiveness frequently improves with age, a 73-year-old flight line veteran was one of eight general aviation mechanics honored last month in the just concluded regional phase of the fifth annual FAA Aviation Mechanic Safety Awards program.

Donald Griffith, a mechanic employed by Queen City Flying Service, Cincinnati, was eight years old when the Wright brothers introduced the world to powered, heavier-than-air flight.

The award winners are normally picked for specific outstanding improvements, original suggestions and developments which resulted in increased reliability, or more effective maintenance or inspection procedures for aircraft, engines or components. Griffith, however, was selected for his consistent efforts toward aviation safety and a *life-time* of special acts and contributions in aviation maintenance.

The FAA Aviation Mechanic Safety Awards program, which began in 1963, is a government-industry-labor effort to honor the men who "keep them flying"—with dependability and safety. This year's participating sponsors are the Air Transport Association of America, American Aviation Publications, and the National Aviation Trades Association.

The competition is divided into two categories—general aviation and air carrier mechanics. Interested persons are invited to submit nominations in either group, giving a brief account of the man's contribution to aviation safety. The candidate need not be a certificated airframe or powerplant mechanic, and mechanics in the military services are invited to participate, provided their contribution has application to civil aircraft.

In addition to the eight general aviation mechanics selected for regional awards this year, 10 men were selected for awards in the air carrier category. Each winner received an engraved plaque in recognition of his achievement. The names and entries of all 18 have been submitted to the Flight Safety Foundation where a panel of key aviation executives will determined the national winner in each category.

The two national winners each will receive a $500 cash award and a trip to Washington, D.C. for themselves and their families.

Eight general aviation winners were selected from 44 state winners on the basis of (1) design improvements to airframes, engines or components; (2) development of new or improved maintenance or inspection procedures; or (3) demonstration of a "high level of professionalism and excellence" in the performance of the duties of an aviation mechanic.

Other general aviation mechanics who qualified for regional awards and consideration for the national title follow:

H. Stan Halvarson, of Wien Alaska Airlines, Fairbanks. He devised a method for automatically energizing the auxiliary fuel pump in a Hiller helicopter, enabling the system to continue operating with lowered fuel pressure. Since the fuel supply in this helicopter is located below the powerplant, gravity cannot supply fuel in the event of a fuel system malfunction.

Robert M. Garmon, of Des Moines Flying Service, Des Moines, was selected for his consistent demonstration of a high level of professionalism and excellence as an aircraft mechanic. A key factor in his selection was his development of inspection procedures for meeting the altimeter and static system tests required by Federal Aviation Regulations.

An all around top-notch performance won the award for **Clarion P. Young,** of Air Service Corp., Honolulu. He has a private pilot license with multi-engine and glider pilot ratings, and has been active in the Civil Air Patrol for several years.

William G. Palmer and **Ira McCord,** of Page Aircraft Maintenance, Inc., Fort

Left—Daniel D. Grecco, of Pearson Air Park, Washington, was another front-runner in the general aviation class. Right—The difficult problem of accurately measuring tail rotor backlash was solved by William G. Palmer (left) and Ira McCord, of Page Maintenance, who designed and made a device to gauge the amount of wear on the rotor gear teeth.

X-ray examination of jet engine devised by Pan American Airways mechanic Franklin E. Robinson permits detailed inspection of the engine on the plane and cuts inspection time to three hours. Procedure increases safety, cuts cost.

Rucker, Ala., are a two-man team in the south who tackled a tough problem and solved it well enough to move them into the pleasant glare of the winner's spotlight. They devised a tool to accurately measure backlash of the tail rotor gear box on many models of Bell helicopters. Until they designed and made their tool, there was no accurate way to measure the cause of the backlash—wear on the gear teeth. Whether the gear assembly was permitted to continue in service or whether it was condemned, had up till then been largely a matter of approximation of wear on the gears. The tool has resulted in increased reliability and safety in the gear box.

Another man whose work with helicopters qualified him for a plaque is **Creston L. Tysdale,** of Petroleum Helicopters, Inc., Lafayette, La. He was selected for his continuous efforts toward aviation safety in establishing improved procedures for maintaining, inspecting and repairing helicopter fleets.

A former barnstorming stuntman turned aviation mechanic made the transition so successfully that he qualified for a plaque. **Daniel D. Grecco,** of Amphibians, Inc., Pearson Air Park, Vancouver, Wash., made the grade for his many years of ingenuity, initiative and imagination, and for far exceeding the requirements of his job in the promotion of safety in general aviation maintenance.

Teamwork was evident among the winners in the air carrier category. Two, two-man teams, one in FAA's Central Region, the other in the Pacific Region, put their heads and hands together to solve in one case, a hazard to flight, and in the other, a hazard to maintenance personnel.

In the Central Region, **William Bridges** and **James Morris,** of Ozark Airlines, Inc., St. Louis, devised a control to prevent serious malfunction in the FH-227 flap control system. They devised a cut-out switch which removed all primary power from the flap system if the flaps exceeded the normal full up or full down position.

Calvin Loo and **Philip Akai,** from Aloha Airlines, Inc., Honolulu, took much of the muscle required out of several heavy aircraft maintenance procedures by devising a versatile, easily moved, hydraulic lifting rig. By its use, the danger of strain injuries to mechanics was reduced, and the time required to do certain heavy jobs, such as removing the wheels and landing gear from *Viscounts* and BAC-1-11s, was materially reduced. A further refinement of the lift permitted installation of an X-ray unit for radiological inspection of large aircraft.

Far from balmy Hawaii, **Harry Durgeloh** of Northern Consolidated Airlines, Anchorage, Alaska, wrestled with a balky hydraulic pump problem in a G-73 *Mallard* which had plagued NCA's *Mallard* operations. A different model pump was the solution but the answer was not as simple as "remove and replace." Durgeloh designed, manufactured and installed a new pad adapter and drive assembly to accommodate a desired pump unit.

A device to accurately trouble shoot an aircraft automatic pilot system was **R. N. Smythe's** winning entry in the Eastern Region. A mechanic in the gyro shop at American Airlines, Inc., maintenance depot at Tulsa, Smythe suggested and then built a vertical gyro simulator that completely checks out the autopilot system in the shop including the vertical gyro, directional gyro, horizon director indicator, course deviation indicator, radio magnetic direction indicator and related components and circuitry, plus the radar stabilization system.

The European Region air carrier mechanic award went to **Franklin E. Robinson,** who works for Pan American Airways at Kennedy International Airport. He used iridium

Bronze medallion award has bas-relief lettering, measures 4½ inches by 5 inches. It is awarded to national winners.

192-50 to examine the internal structure of JT4A engines. Using his procedure, a complete radioisotope inspection can be made in three hours and can be performed with the engine mounted on the plane.

Robert H. Cook, of National Airlines, Inc., Miami, earned his plaque by figuring out a way to keep a door shut. The door in question is the fuel access door of the B-727, which opened in flight under certain conditions. When the door opened there was a danger of it coming into contact with some of the leading edge slats, and could damage both. Cook, a line maintenance lead mechanic, recommended that the original "stay rods" be replaced with cables. These would allow the door adequate opening for fueling but restricted it from opening far enough to catch on the leading edge slats.

Distrust of guesswork prompted **Maxcell M. Renfro,** Trans Texas Airways, Houston, to design and promote the installation of a backup warning system which enables flight crews to accurately determine whether the landing gear/or warning system of the landing gear in CV-240M or CV-600 aircraft is functioning properly. His development of a sure system won him the plaque for the Southwest Region.

A method for heading off potential engine destruction due to failure of sixth-stage compressor blade locks in JT8D jet engines had a two-fold reward for **Dean Webster,** of United Airlines, San Francisco. He won the highest cash suggestion award ever paid by his company, and his discovery made him top choice as the air carrier mechanic in the Western Region.

Webster combined use of a 10,000 candlepower Iota Cam light source and a flexible fiberoptic light rod and cystoscope boroscope. All the components had long been in use—Webster brought them together to make an effective inspection tool.

American mechanical ingenuity has long been a byword all over the world, and America's flight safety record is unsurpassed. A major share of the credit for this outstanding safety record is due the capability and dedication of the airframe and powerplant mechanics who "keep them flying"—safely.

(Complete details on the mechanic safety awards program are available free of charge from: Federal Aviation Administration (TAD 484.3), 800 Independence Ave., S.W., Washington, D.C. 20590. Ask for "Annual Aviation Mechanic Safety Awards Program," (AC 60-2D). Enclose a self-addressed mailing label with request. ■

FLYING FISH

Between mid-June and mid-September each year, literally hundreds of high mountain lakes are "bombed" by fleets of low-and-slow-flying aircraft.

The "bombs" are clusters of several thousand fingerling trout spilled out of aircraft as they skim over the waters. The aircraft are manned by pilots of state conservation agencies carrying out a long-range program of stocking and restocking inaccessible mountain lakes for the benefit of America's sportsmen.

The old method of transplanting fish was to load fingerlings in 10-gallon milk cans and transport them to the high lakes on pack horses. Because of the heat, oxygen problems, and injuries from the slamming around they got inside the cans, few lived.

"Flying fish" easily survive their airlift to mountain lakes. Tests show fingerlings can be dropped safely from altitudes up to 800 feet above the ground. (The average "freefall" drop is 250 feet or less.) The Utah Department of Fish and Game reports that on the average 99 out of every 100 fish dropped by plane survives.

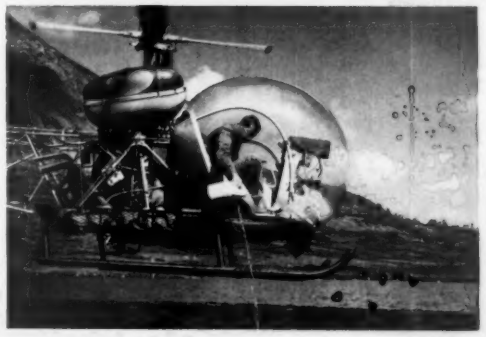
A major benefit of transplanting fish by air is low cost. A mountain lake can be stocked with several thousand fingerlings for about $17, the Oregon State Game Commission estimates.

Ralph Noble, chief pilot for Utah's Department of Fish and Game, gives careful attention to such factors as weight density, altitude and stall speed in this work. When Noble's Cessna 180 is loaded with 60 pounds of tiny trout—swimming in 400 pounds of water—it is near the maximum gross weight for this airplane.

Alertness at the controls is very much in order, because slow flying at altitudes of 10,000 or more, to unload fish, may bring the aircraft close to its stall speed. A sudden pull-up out of a basin or canyon could bring about a stall under circumstances where recovery is not possible.

Stocking fish in the future may be done somewhat more safely by helicopter. However, the cost of helicopter fish planting is still very high, compared with the use of fixed wing aircraft.

A typical aerial fish planting program is that carried out by the California Department of Fish and Game, the first state agency in the nation to utilize aircraft in



Colorado Game Fish and Parks Department plane pours fingerlings into Rocky Mountain lake. Fish can be dropped from as high as 800 feet without harm. Left—'Copter makes delivery at almost surface level. Aircraft have also been used successfully to transplant small animals and birds as part of conservation programs.

Piper Pawnee agriculture plane takes on a load of fingerlings from special portable tank trucked to wilderness airfield.

Weight of fish and water is important in loading plane for high altitude seeding by conservation-pilots.

conservation and patrol work on a full-time basis.

The Department's four full-time pilots operate three planes out of two hangars, one in Northern California (Sacramento) and the other in Southern California (San Bernadino).

Veteran Pilot, Carrol Faist, is in charge of the state's "Air Wing." He and his staff, consisting of Pat Symons, Leo Singer, and Bob Powers, have an average flying time of nearly 15,000 hours.

Each of the warden-pilots is also a licensed aircraft and powerplant mechanic. All maintenance and mechanical work is done by them. Each plane averages about 650 hours annually in conservation work.

The California Department of Fish and Game occasionally uses its aircraft to transplant wild birds and animals. Beaver, for example, have been trapped in sections where they were a nuisance, and dropped into areas where they were needed and wanted. Placed individually in burlap sacks, they are parachuted in groups of four or five to their new homes. Occasionally, birds such as partridges and wild turkeys are air transplanted into mountain terrain not accessible by land transport.

The Bureau of Sport Fisheries and Wildlife, Department of Interior, has a fleet of 45 aircraft used primarily for wildlife survey work in the Bureau's six regions across the country. Bureau aircraft have been used for herding caribou and reindeer in Alaska; for control of wolves and coyotes; for survey of waterfowl breeding grounds in Canada and Alaska; and for wildlife surveys of deer, moose and elk. The Bureau has 65 pilots, some of whom also fly helicopters.

Use of aircraft in both federal and state fish and wildlife management activity is continuing to expand. As a modern supplement to other mechanized tools used in research, management, and protection of our wildlife resources, the aircraft has proven itself many times over. ■

—Cliff Cernick

CORRECTION

Prior to March 16, the minimum separation from clouds for VFR flight below 14,500 feet MSL was 1,000 feet above, 500 feet below, and 2,000 feet horizontally—not 1,000 feet horizontally, as indicated erroneously in the March news briefs.

The new rule currently in effect requires a cloud clearance of 1,000 feet vertically and one mile horizontally—with at least five miles visibility—for all VFR flight above 10,000 feet (or more than 1,200 feet above ground level, if higher).

BRIEFS

• WINSTON-SALEM, FAMOUS FOR TOBACCO has a new crop—aircraft maintenance technicians. The first class of Piedmont Aviation's Piedmont Aerospace Institute received diplomas last month, with several graduates taking immediate employment with Piedmont. Started in November 1966, the institute now has 95 students enrolled in five classes, and plans call for expansion. Late this summer Piedmont will move into a new $7 million facility at Smith Reynolds Airport, Winston-Salem, N.C. Present facilities will be taken over by the mechanic school.

• A RESURRECTED DE HAVILAND 4, which crashed into a Utah mountain peak during a blinding snowstorm while carrying the mail in December 1922, will make a final "ghost" flight, enroute to a permanent roost in the Smithsonian Institution, in April. Work to restore the WW I bomber was begun in 1965 by a dwindling but proud aviation organization—the Air Mail Pioneers Association in Santa Paula, Calif. A fire in October 1967 destroyed a substantial part of the plane, setting the project back. The plane "old 249" was scheduled to take off from San Francisco April 10 and arrive in Washington April 28, flying over California, Nevada, Utah, Wyoming, Nebraska, Iowa, Illinois, Ohio, Pennsylvania and New York. The memorial flight has been scheduled to coincide with the 50th Anniversary of the U.S. Mail Service.

• CRASH LOCATOR BEACONS for some general aviation flights? FAA has published an advance notice of proposed rule making, pointing out that such devices could speed up search and rescue efforts, especially in remote regions, and in bad weather. The notice seeks comments on "What kind of planes should be required to have crash locator beacons?" "Under what kind of operations should equipment be required, that is, over water, mountain terrain, sparsely populated areas, etc?" and "what consideration should be given to climate, season of the year, and geographical area in designing a beacon?"

• FAA CONSIDERING NEW 'CHUTE REGULATIONS. In step with the rapid growth of sport parachute jumping, FAA has published an advance notice of proposed rule making, exploring the need to rewrite the rules governing packing, maintenance, alteration, and classification of parachutes, along with parachute rigger qualifications. FAA is concerned with modern developments in parachute technology brought about largely by the popularity of sport parachuting. The controllability and maneuverability of sport jumping parachutes and their deployment, and the use of new materials and hardware may require more extensive regulation. Comments should be submitted by June 12 to FAA Rules Docket, GC-24, Office of General Council, 800 Independence Ave., N.W., Washington, D.C. 20590, making reference to Docket 8759, Notice 68-7.

FAA SEEKS 800 AIR TRAFFIC CONTROL SPECIALISTS

Career opportunities in air traffic control are being advertised by the Federal Aviation Administration, now actively recruiting to fill some 800 vacancies before June 30.

Except for Alaska, air traffic control specialist vacancies exist in all of FAA's seven U.S. regions. The largest number are in the Eastern region. Vacancies also exist in these other FAA Regions: Southern, Western, Central, Southwest, and Pacific.

Candidates for controller positions at a center or in a tower may apply if they served either as a rated military air traffic controller, or an airline dispatcher, qualified as an instrument pilot, or held a navigator's certificate or the military equivalent.

Qualifications for a job in a flight service station include progressively responsible experience in air/ground radio communications or flight operations or 350 hours logged as a rated private, or military pilot.

Consideration will also be given applicants for center, tower or flight service station jobs who have completed a four-year college course leading to a bachelor's degree, or who have acquired equivalent experience in administrative, professional, investigative, technical or other work which would prepare an individual to enter into a position of responsibility.

Candidates must be at least 21 years old, pass a rigid physical examination, and successfully complete a written test to determine their ability to learn and perform air traffic control specialist duties.

Starting salary for trainees is $118 for a 40-hour week, with a salary increase to $142 per week after satisfactory completion of six months' training. An additional increase is granted after 12 months service.

Persons entering FAA's air traffic control service who qualify at the journeyman level earn from $155 to $286 per week. Additional compensation is also paid for night, Sunday, holiday or overtime duty, with many additional employee benefits.

"Report to Industry" Session Scheduled for June 11

A new edition of last year's highly successful "Report to Industry" will be presented by FAA on June 11 in a day-long session at its headquarters in Washington, D.C.

Inaugurated last year, the report is an up-to-date accounting of FAA's continuing research and development programs. Key staff members of the agency's Systems Research and Development Service, Aircraft Development Service, Office of Aviation Medicine and the National Airspace System Program Office will participate.

This year's "Report to Industry," like last year's, is intended to keep the aviation community informed of FAA's progress in research and development. Last year, some 250 persons representing manufacturers, associations and other Government agencies attended.

Persons interested in attending can obtain full details by writing on company letterhead to: "Report to Industry Committee," Federal Aviation Administration, DD-1, 800 Independence Ave., S.W. Washington, D.C. 20590.

Airport Construction Keeps Up with Aviation Growth

More than one new airport a day was added to the total number in the U.S. in 1967, bringing the over-all number to 9,276 by year's end. During the year operators reported 375 new airports to FAA.

At the same time, FAA figures show that 280 airports, 35 heliports and seven seaplane bases were abandoned.

Total number of landing facilities on record with FAA at the end of 1967 was 10,126, a figure which included 452 heliports, and 398 seaplane bases. Also included were 19 airports in Puerto Rico, three in the Virgin Islands, and five in the South Pacific.

Texas retained its number one spot among the states with 900 landing facilities, 871 of which were airports, 26 heliports and 3 seaplane bases. (As to be expected, Alaska, with 168 seaplane bases, was far and away the top state in that category, with Maine trailing in second position with 42.)

California had 684 landing facilities; Alaska, 626; Pennsylvania, 443; Illinois, 433; Ohio, 397; New York, 338; Florida, 281; Kansas, 266; and Missouri, 265.

California was also the top state in heliports with 146, followed by New Jersey with 29, Pennsylvania with 27, Texas with 26 and New York with 25. Illinois, Louisiana and Massachusetts each had 20.

Eleven states, Alabama, Arkansas, Delaware, Hawaii, Indiana, Mississippi, Nevada, North Dakota, Rhode Island, South Carolina, and Tennessee have no heliports.

After Alaska and Maine, the top three states in seaplane bases are: Minnesota, 29; New York, 28; and Louisiana, 27.

Of the national total, 6,296 are privately owned airports. There are 3,149 airports with lighted runways, and 3,109 with paved runways. Airline turbojet service was available in 1967 at 182 airports.

Complete details are available from the Personnel Officer in the nearest FAA facility or Class I Post offices.

New Red Centerline Lighting Shows "Runway Remaining" During Takeoff

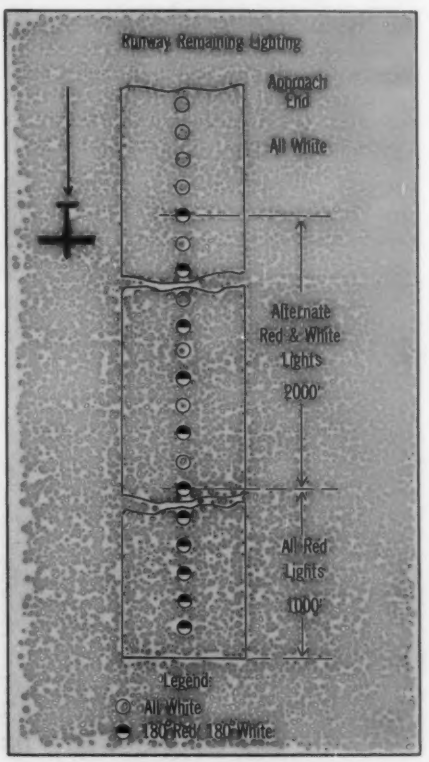
Red runway centerline lights to be installed at some of the nation's busiest airports will caution pilots entering the last 3,000 feet of runway during takeoffs and landings under a new standard for "runway remaining lighting" adopted by the Federal Aviation Administration.

Alternate red and white runway centerline lights will alert the pilot that he is approaching the end of the runway. They will be installed from the 3,000-foot to the 1,000-foot points. All-red centerline lights will mark the last 1,000 feet of the runway.

The new system will provide greater safety on runways in low visibility weather conditions for both takeoff and landing operations. It will reduce wear and tear on aircraft brakes and tires by providing a visual indication of aircraft position with respect to the end of the runwy which cannot always be seen in low visibility.

Existing all-white centerline lights can be adapted to the new system by the insertion of red filters at an estimated cost of approximately $500 per installation. Runway lighting is eligible for Federal financial assistance under the Federal-aid Airport Program (FAAP).

The red warning lights are required for all airports approved for low visibility flight operations (Category II), and recommended for all runways equipped with centerline lighting.



FORUM

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but names will be withheld on request.

• Destination: Panama

I am planning a flight from Los Angeles to Panama and all that is lacking is information on the charts, documents, special permits, and whatever else might be needed. Any suggestions as to where I can obtain this information?

San Francisco

Your closest agency contact is Mr. William E. Cunningham, FAA Area Manager for San Francisco, 813 Mitten Road, Burlingame, Calif. 94010. Another good source of information is the U.S. Passport Office, Federal Building, Room 1405 450 Golden Gate Ave., San Francisco, Calif. 94102.

• Airlines Training Pilots?

A recent article in an aviation publication indicated that some major air lines are anticipating a pilot shortage and are offering training programs to some college students and graduates. The article said "In some instances the program includes financial assistance plans to aid successful candidates in obtaining the required training."

Do you have any information on these programs?

Michigan

Write directly to the personnel offices of the major airlines for details on their programs, if any. Airline policies fluctuate in this respect. Also, if you had military service in recent years it is possible that you might qualify for assistance under the Veterans Readjustment Act of 1967 (the new G.I. Bill of Rights). Check with your local Veterans Administration Office.

• Delayed Response to IFR Calls

I'll never complain about my taxes going to FAA and the services which are so cheerfully and competently handled. Rarely have I heard of, or experienced, a discourteous remark or reply in an FAA station, by phone, or radio.

But I have a problem, and I don't know if it is my fault, FAA's, or the system's.

On IFR, when I switch from one center to another, I will listen, call in and report. But I get no answer. After repeating this two or three times I will sometimes hear "32 Foxtrot please stand by, we are busy."

I am sure the center is on another higher frequency which I do not hear when calling on the assigned frequency. I don't want to push the center but I don't know if they are receiving me or not as I am on the border of their area. I hesitate to call in again and again when no answer is received. What do you suggest?

Chester L. Roberts
Glendale, Calif.

A center controller does sometimes monitor and transmit on more than one air-ground frequency. For example, he may listen or guard simultaneously a specific civil very high frequency (VHF), and a specific military ultra-high frequency (UHF), or two different VHF frequencies, or two different UHF frequencies.

When this occurs, a pilot calling on one of these paired frequencies would be unaware that the center controller could be receiving a call on the other frequency.

We suggest a nominal pause between "call-in" transmissions to allow the center controller to finish prior communications and to return the call.

• Blue Seal on Multi-engine Ticket

In the December issue, you explained the purpose of the "Blue Seal" as it applies to a Private Pilot Certificate.

Early in 1967 I added an instrument rating to my Commercial Multi-engine Certificate. On instructions from the examiner, the new certificate was issued as a "Blue Seal" rating. Please explain the meaning of "Blue Seal" as it applies to my certificate.

R. D. Heyl
Montoursville, Penn.

A blue seal on the corner of a pilot certificate indicates that its holder has demonstrated some ability to control an airplane in flight solely by reference to instruments. It conveys no additional privilege, but serves only as evidence of an emergency capability.

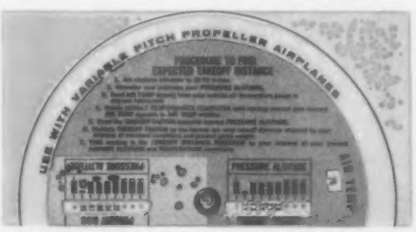
Pilots who earned their original pilot certificate since 1959 have been required to have this elementary instrument capability, but many who received their certificates before then had never had any instrument indoctrination whatever. FAA instituted the "Blue Seal" program in 1961 to identify pilots who have had instruction in the use of flight instruments, and to serve as an incentive for others to obtain such instruction.

• Koch vs. Denalt

I understand the Koch Chart for Altitude and Temperature Effects has been discontinued by the FAA, and has been replaced by the Denalt Performance Computer. Also, future sectional charts will include some form of density altitude information.

What is the lack of validity in the Koch Chart, and how did the Denalt Computer come about?

California



During a study of density altitude, FAA re-evaluated the Koch Chart and found it to be overly conservative, based on current airplane performance. The Koch Chart is still valid, but the degree of conservatism reduces its usefulness.

The Denalt Computer was developed to educate pilots on the effects of density altitude on single-engine general aviation aircraft performance, and to reduce density altitude accidents.

The Computer is based on information provided in the aircraft owner's manuals and is intended to supplement but NOT replace manufacturer's published performance information. The computer is overly conservative for both multi-engine airplanes and airplanes equipped with supercharged engines.

Sectional charts will include a notice that the Denalt Performance Computer has replaced the Koch chart, but there are no plans to include a Density Altitude Chart on future sectionals.

Denalt Performance Computers are available for 50 cents each from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Specify fixed or variable pitch.

• Knots or Miles?

I've wondered why airports relay wind velocity information to pilots in knots instead of miles-per-hour as they once did. Since airspeed indicators in airplanes are calibrated in mph wouldn't it appear more practical to give this information in mph and save the pilot the effort of converting from knots back to mph?

St. Paul, Minn.

Wherever possible, FAA is changing all mileage reference to nautical miles in order to more closely conform with those terms used internationally. Only a few exceptions to the nautical description remain today, i.e., control zone definitions and flight visibility. Most airspeed indicators provided on new aircraft for the past several years have either a combined knots/miles-per-hour display or a knots only display. As far as we know, no airspeed indicator presenting mph is presently offered as new equipment.

• Calling Unknown FSS

In our area we all know that Centralia, Bible Grove, and several other VORs are handled by the Vandalia, Ill., flight service station. When I'm out of this neighborhood I sometime have difficulty in determining the FSS servicing the omni to which I am tuned.

Could I simply call up the VOR, like "Centralia VOR, this is *Cherokee* 203 X-Ray"? It would seem that this would be most efficient because Vandalia would immediately know which omni through which the call was made. I know from experience that if I mistakenly call the wrong FSS, I won't receive an answer.

D. E. Furnal
Mt. Vernon, Ill.

An initial callup to Centralia VOR can certainly be used if the pilot is unsure of the correct facility.

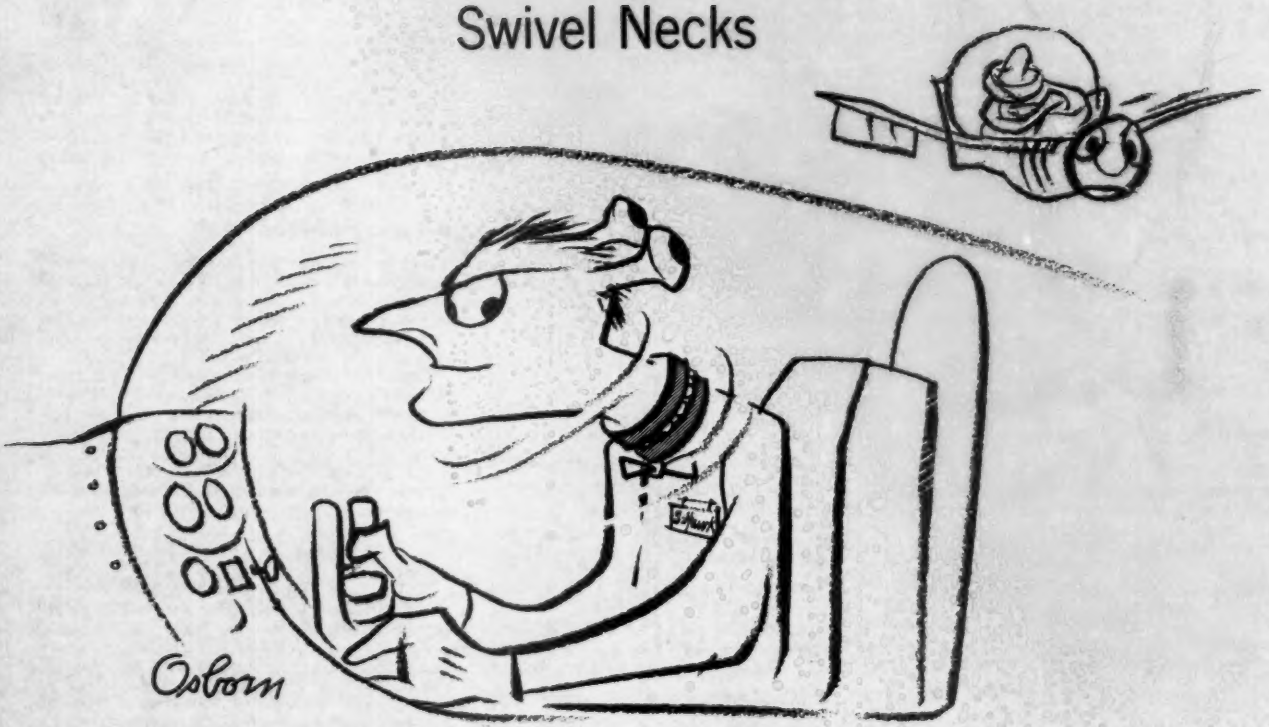
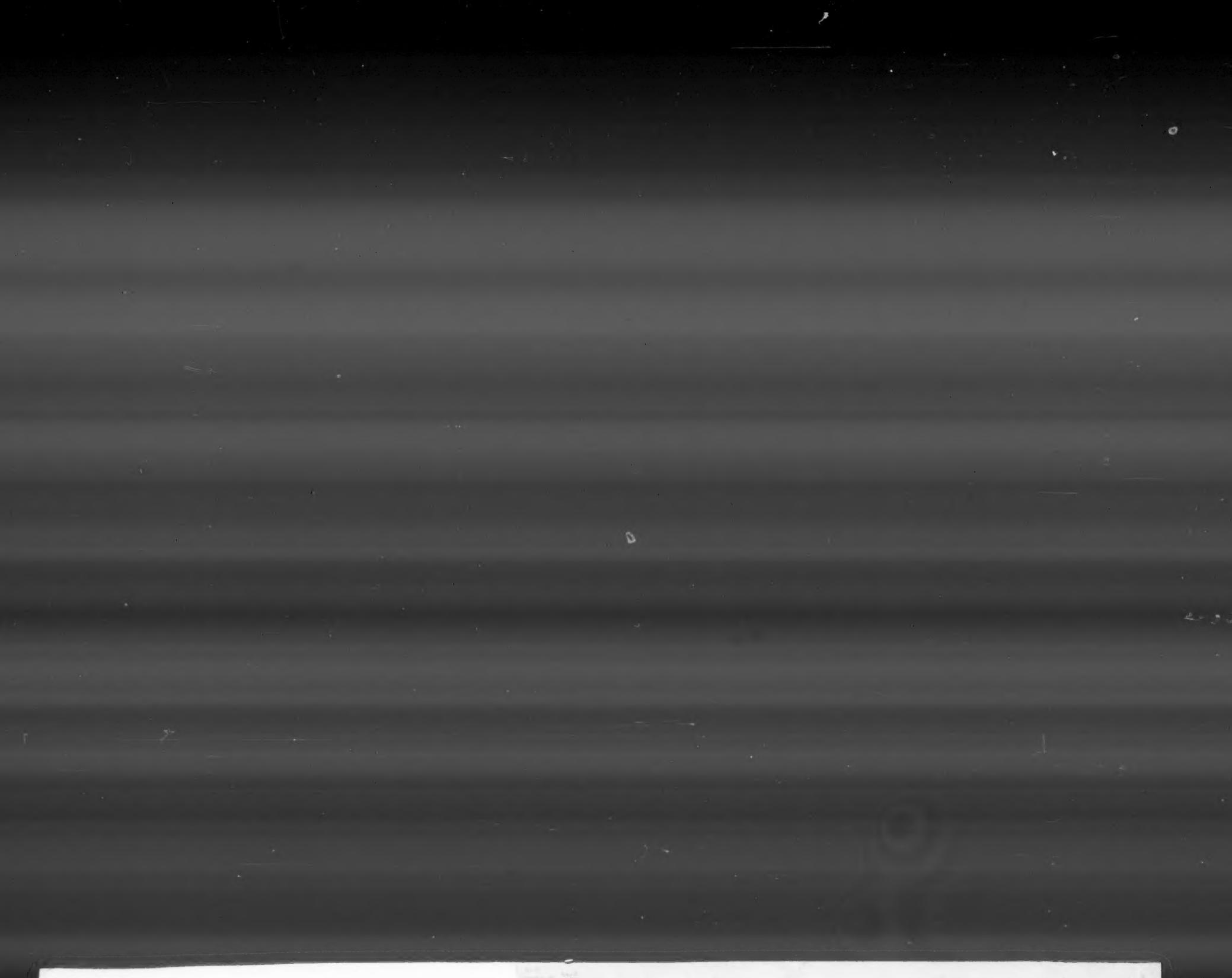
But appropriate Coast and Geodetic enroute low altitude charts eliminate any guess work. These have the controlling facility printed in a box under each VOR name plate. This is the most readily available information for a pilot operating either IFR or VFR and is updated on a monthly basis.

For additional information see the Airman's Information Manual, Part 1, *under the chapter dealing with radiotelephone phraseology and techniques.*

FEDERAL AVIATION ADMINISTRATION
DEPARTMENT OF TRANSPORTATION
WASHINGTON, D. C. 20590

OFFICIAL BUSINESS

Swivel Necks



Prevent Wrecks